WATER INDEPENDENCE BLUEPRINT

Collect. Filter. Store. Test. Survive.

3 Days	2 Litres	Free	Simple
without water = death	minimum per person per day	rainwater is everywhere	filtration anyone can build

WHAT'S INSIDE:

1. Understanding Water Safety
2. Rainwater Collection
3. DIY Filtration Systems
4. Chemical Purification
5. Long-Term Storage
6. Water Testing
7. Community Water Strategy
8. Emergency Quick Reference

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Water kills faster than almost anything else in a crisis.

Without safe water, the human body fails within 3 days. Contaminated water kills through cholera, typhoid, dysentery, and dozens of other illnesses — often faster than thirst itself. This section covers what makes water dangerous and how to think about safety before treating it.

THE THREE THREATS IN ANY WATER SOURCE

BIOLOGICAL

- E. coli, Salmonella, Cholera bacteria
- Hepatitis A, Norovirus, Rotavirus
- Giardia, Cryptosporidium (parasites)

KILLED BY: Boiling, chemical treatment, UV

Most common threat. Invisible. Deadly.

CHEMICAL

- Lead, arsenic, mercury from pipes/soil
- Agricultural runoff: pesticides, nitrates
- Industrial waste, fuel contamination

REMOVED BY: Activated carbon, distillation

Cannot boil away. Requires filtration.

PHYSICAL

- Dirt, sand, silt, organic matter
- Makes water look brown or cloudy
- Clogs filters, carries bacteria

REMOVED BY: Pre-filtering, settling, cloth

First step before any other treatment.

HOW MUCH WATER DO YOU ACTUALLY NEED?

Drinking Per person per day — absolute minimum	**2 litres**	
Cooking Per person per day for basic meals	**1 litre**	
Basic hygiene Handwashing, wound care, sanitation	**2 litres**	
Total minimum Per person per day to stay healthy	**5 litres**	
Comfortable Per person per day for full hygiene	**10+ litres**	
Medical/infant Extra per sick person or infant	**+2 litres**	

THE GOLDEN RULES OF WATER SAFETY

NEVER drink untreated surface water.
Rivers, lakes, puddles, and streams contain pathogens even when they look clean.

Always treat before drinking.
Collection is just the first step. Every source needs treatment before it is safe.

Layer your methods.
Pre-filter, then purify. Two methods together are always safer than one alone.

Store treated water covered.
Contamination happens after treatment too. Covered containers prevent re-infection.

When in doubt, boil.
Boiling kills all biological threats. It is always the most reliable backup method.

Rain is free, abundant, and relatively clean before it hits the ground.

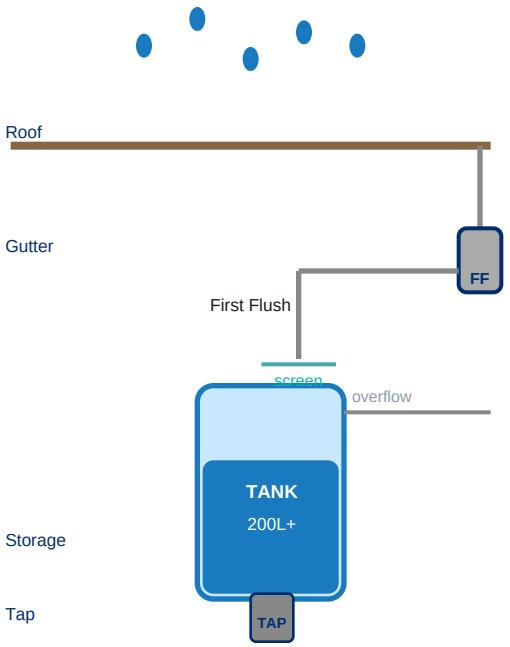
A properly set up rainwater collection system can provide enough water for multiple households with minimal materials. The key is catching it before it picks up contaminants and storing it correctly. Even a small roof area collects significant volume.

HOW MUCH RAIN CAN YOU COLLECT?

COLLECTION FORMULA

Litres collected = Roof area (m²) × Rainfall (mm) × 0.8 (efficiency factor)

Example: 50m² roof × 25mm rain × 0.8 = 1,000 litres from a single rain event



STEP 1 — Choose Your Catchment
Metal, tile, or plastic roofs work best.
Avoid asphalt shingles — leach chemicals.
Larger roof area = more water collected.
Minimum useful size: 10 square metres.

STEP 2 — First Flush Diverter
First rain washes off roof contaminants.
Divert the first 25 litres away from tank.
Simple: T-junction with a capped standpipe.
Critical step — do not skip this.

STEP 3 — Gutters and Downspout
Standard gutters work perfectly.
Screen openings to block leaves and debris.
Clean gutters before rainy season.
Slope gutters at least 1cm per metre.

STEP 4 — Inlet Screen
Fine mesh screen at tank inlet.
Blocks insects, debris, and larger particles.
Replace or clean monthly.
Window screen mesh (1mm) is sufficient.

STEP 5 — Overflow Pipe
Install overflow at top of tank.
Direct overflow away from foundation.
Prevents flooding and contamination.
Screen the overflow outlet too.

RAINFALL YIELD REFERENCE TABLE (50m² roof)

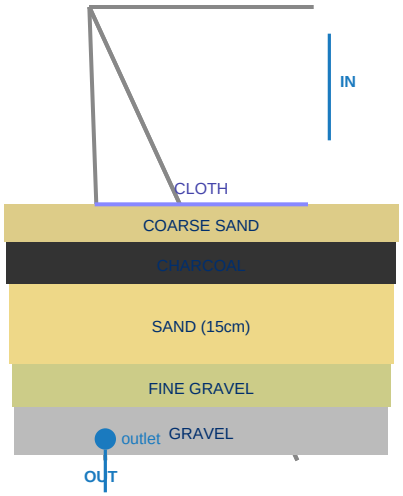
Rainfall Type	Depth	Yield	Equivalent
Light rain	5mm	200L	40 person-days drinking water
Moderate rain	15mm	600L	120 person-days drinking water
Heavy rain	25mm	1,000L	200 person-days drinking water
Storm event	50mm	2,000L	400 person-days drinking water

IMPORTANT:
Rainwater must still be filtered and purified before drinking. Collection removes the source problem but does not remove biological or chemical contaminants that land on your roof.

Filtration removes physical particles and many chemical contaminants.

Filtration is NOT the same as purification. It removes sediment, debris, and some chemicals but does NOT kill bacteria or viruses on its own. Always combine filtration with a purification step (boiling, chemical treatment, or UV). The systems below are buildable from widely available materials.

BUILD 1: GRAVITY SAND FILTER



1 — Get a container
Large plastic bucket or barrel, 20L+. Drill a small hole near the bottom for outflow.

2 — Layer 1 — Gravel (bottom)
4cm of coarse gravel. This is the drainage layer. Keeps sand from clogging the outlet.

3 — Layer 2 — Fine gravel
4cm of pea gravel or small stones. Transition layer between coarse and sand.

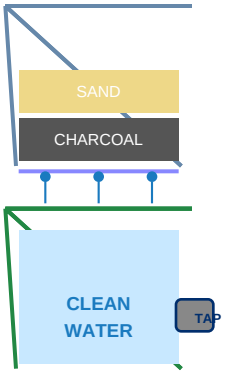
4 — Layer 3 — Play sand
15cm of clean play sand or pool filter sand. Main filtration layer.

5 — Layer 4 — Charcoal
5cm of crushed charcoal (not lighter fluid charcoal). Removes chemicals and odors.

6 — Layer 5 — Coarse sand
5cm of coarse sand on top. Pre-filters large particles.

7 — Cloth cover
Stretch cloth or bandana over the top opening. Catches large debris before it enters.

BUILD 2: MULTI-STAGE BUCKET FILTER



1 — Two buckets
Stack two identical buckets. Top one filters, bottom one collects clean water.

2 — Drill top bucket
Drill 6-8 small holes (3mm) in the bottom of the top bucket.

3 — Cloth layer
Stretch fine cloth (t-shirt fabric) across the bottom. Holds filter media in.

4 — Fill with charcoal
Pack 8cm of crushed charcoal (activated if possible) on the cloth layer.

5 — Add sand layer
5cm of fine sand on top of the charcoal.

6 — Top cloth cover
Another cloth layer on top to pre-filter incoming water.

7 — Add tap to bottom bucket
Drill and fit a small tap at the bottom of the lower bucket.

CRITICAL:
These filters REMOVE sediment and some chemicals but DO NOT kill bacteria or viruses. Always follow filtration with boiling or chemical purification before drinking.

Purification kills biological threats. This step is non-negotiable.

Filtration removes particles and some chemicals. Purification kills bacteria, viruses, and parasites. You need BOTH. Always filter first, then purify. Here are four proven methods ranked from most reliable to most situational.

#1 BOILING

MOST RELIABLE

KILLS: ALL biological threats — bacteria, viruses, parasites

HOW TO USE:

- Bring water to a rolling boil for at least 1 full minute.
- At elevations above 2,000m: boil for 3 minutes.
- Let cool in a covered container before drinking.
- Rolling boil means large rapid bubbles — not just simmering.

When in doubt, boil. It is always the right answer.

#2 BLEACH / CHLORINE

EASY & EFFECTIVE

KILLS: Most bacteria and viruses. Less effective against Cryptospori...

HOW TO USE:

- Use plain unscented household bleach (5-8% sodium hypochlorite).
- Clear water: 2 drops per litre. Cloudy water: 4 drops per litre.
- Stir and let sit for 30 minutes before drinking.
- Treated water should have a faint chlorine smell. If not, repeat.

Stock 1 litre of bleach per person per month of emergency planning.

#3 IODINE / WATER TABLETS

PORTABLE BACKUP

KILLS: Bacteria and most viruses. Not effective against Cryptosporid...

HOW TO USE:

- Follow package instructions exactly — dosing varies by brand.
- General: 5 drops of 2% iodine per litre of clear water.
- Wait 30 minutes before drinking (60 minutes if cold or cloudy).
- Vitamin C can neutralize iodine taste AFTER wait time is complete.

Best for personal emergency kits and short-term use only.

#4 SOLAR DISINFECTION (SODIS)

NO CHEMICALS NEEDED

KILLS: Most bacteria and viruses with sufficient UV exposure.

HOW TO USE:

- Fill a clear plastic or glass bottle (PET plastic, 2L max) with filtered water.
- Lay flat on a reflective surface (corrugated metal roof works well).
- Leave in direct sunlight for 6 hours minimum (2 days if cloudy).
- Shake bottle before laying out — oxygen improves effectiveness.

Excellent for communities with no access to chemicals or fuel.

QUICK COMPARISON

Method	Kills Bacteria	Kills Viruses	Kills Parasites	Needs Fuel	Needs Chemicals
Boiling	YES	YES	YES	YES	NO
Bleach	YES	YES	PARTIAL	NO	YES
Iodine tabs	YES	YES	NO	NO	YES
SODIS (sun)	YES	MOST	NO	NO	NO

SECTIONS 5 & 6 — STORAGE + WATER TESTING

Keep It Safe After Treatment

LONG-TERM WATER STORAGE

Food-grade plastic (HDPE)
Look for recycling symbol #2. Blue barrels are ideal. 20-200L sizes widely available.

Glass containers
Excellent for small quantities. Dark glass reduces algae growth. Heavy and breakable.

Stainless steel
Best long-term option. No chemical leaching. Expensive but lasts indefinitely.

Regular plastic bottles
PET (#1) bottles work short-term (6-12 months). Avoid reusing disposable bottles long-term.

Milk jugs (HDPE white)
Break down quickly. Fine for 1-2 weeks maximum. Not suitable for long storage.

Any non-food-grade container
Never use containers that held chemicals, motor oil, or non-food items.

STORAGE RULES

- Keep stored water away from direct sunlight.
- Store at a cool, stable temperature (below 25°C).
- Label every container with the date it was filled.
- Rotate stock: use oldest first, refill from fresh.
- Never put your mouth on the container opening.
- Replace stored water every 6-12 months minimum.
- Keep containers off bare concrete — use pallets or boards.
- Store away from chemicals, fuel, and pesticides.

TESTING YOUR WATER

LOW-TECH TESTS (No equipment)

Look at it
Clear water is safer than cloudy. Brown/green color = contamination.

Cloudy water must be filtered before any other treatment.

Smell it
Clean water is odorless. Chemical smell = contamination. Rotten smell = biological.

If it smells wrong, treat it more aggressively before use.

Boil test
If boiling produces unusual foam, discoloration, or smell, the water has heavy contamination.

Heavily contaminated water may need multiple treatment passes.

Soap test
Hard water (minerals) prevents soap from lathering. Not a safety issue but indicates mineral content.

Hard water is safe to drink but may leave mineral deposits.

TEST KITS (If available)

Pool test strips — $5–15
Test chlorine levels after chemical treatment. Widely available.

Water test strips — $15–30
Test for pH, nitrates, bacteria (general). Available online.

Lead test kit — $10–20
Critical if using old pipes or unknown plumbing.

Coliform test kit — $20–40
Tests specifically for fecal bacteria. Most important biological test.

SIGNS WATER IS NOT SAFE

- Anyone who drank it gets sick within 24-48 hours
- Unusual color: brown, green, black, or cloudy
- Strong smell: sulfur, bleach, petroleum, sewage
- Oily sheen visible on the surface
- Located near agricultural fields or industrial sites
- Downstream from animal grazing areas

One household cannot maintain safe water for many people alone.

A neighborhood water strategy divides responsibility, pools resources, and ensures that even if one source fails, others remain available. The model below covers five households and scales up or down with your community size.

THE FIVE HOUSEHOLD WATER MODEL

HH 1 — COLLECTION HUB
Largest roof area for maximum rainwater collection. Maintains the primary 1,000L+ storage tank. Distributes raw collected water to the treatment station.

HH 2 — TREATMENT STATION
Sand and charcoal filtration system. Boiling station with fuel storage. Chemical treatment supplies (bleach, iodine tablets). Produces clean water for distribution.

HH 3 — SECONDARY STORAGE
Maintains 500L of treated water reserve. Acts as buffer when collection is low. Manages a shallow well if available. Monitors water levels across the network.

HH 4 — TESTING + QUALITY
Keeps water test kits and logs results. Monitors for contamination events. Tracks community consumption and flags shortages before they become critical.

HH 5 — SUPPLY + EQUIPMENT
Stores spare filters, bleach, and treatment supplies. Maintains collection containers. Knows how to repair and rebuild filter systems. Backup boiling capacity.

WATER RATIONING IN A SHORTAGE

Daily minimums per person:

Drinking	**2L**
Food preparation	**1L**
Basic sanitation	**0.5L**
Wound care	**0.5L**
Body washing	2L
Laundry (minimal)	4L
Dishes/cleaning	1L

In a severe shortage, prioritize:

1. Infants and young children
2. Elderly and ill persons
3. Pregnant and nursing mothers
4. All adults — drinking only
5. Cooking and basic hygiene
6. Body washing and laundry

WATER SOURCES — WHAT TO USE AND WHAT TO AVOID

Every water source has different risks. Know them before you drink.

RAINWATER — EXCELLENT

Cleanest natural source. Collect before it hits the ground for best quality.

- Pre-filter through cloth
- Treat with boiling or bleach

GROUNDWATER / WELLS — GOOD

Generally cleaner than surface water. Test for chemical and biological contamination.

- Test for coliform bacteria
- Check for agricultural chemical runoff

STREAMS & RIVERS — USABLE WITH TREATMENT

Contains biological and potentially chemical contamination. Always treat.

- Pre-filter all sediment first
- Boil or use strong chemical treatment

LAKES & PONDS — USABLE WITH TREATMENT

Higher risk of algae, parasites, and chemical runoff. Treat aggressively.

- Filter thoroughly for sediment
- Boil for at least 3 minutes

FLOODWATER — HIGH RISK — TREAT AGGRESSIVELY

Floodwater mixes sewage, chemicals, and biological hazards. Extremely dangerous.

- Only use as absolute last resort
- Filter twice then boil for 3+ minutes

SEAWATER — NEVER DRINK UNTREATED

Salt water causes faster dehydration. Cannot be made safe by boiling alone. Requires distillation.

- Distillation only — requires equipment
- Solar still produces very small amounts

SWIMMING POOLS — EMERGENCY ONLY

Pool water contains chlorine and chemicals. Safe to drink in small quantities in a true emergency.

- Already treated — skip extra chlorine
- Can cause GI issues if consumed in large amounts

DEW COLLECTION — SMALL QUANTITIES

Collect dew from clean surfaces at dawn. Very small volumes but chemical-free.

- Wipe clean metal or plastic surfaces
- Collect before sunrise with a clean cloth

EMERGENCY IMPROVISED SOURCES

Water heater tank

Most tanks hold 150-300L of drinkable water. Access via drain valve at the bottom.

Ice cubes / freezer

Melt frozen items. Already treated drinking water.

Canned foods

Liquid from canned vegetables and fruits is safe and provides some hydration.

Water pipes

After shutoff, drain remaining water from pipes by opening the lowest tap in the house.

QUICK REFERENCE CARD

Print This Page — Keep It With Your Water System

Everything you need to remember, at a glance.

PURIFICATION METHODS

BOILING
1 min rolling boil (3 min at altitude)
ALL threats

BLEACH
2 drops/L clear, 4 drops/L cloudy, wait 30 min
Bacteria + viruses

IODINE
5 drops/L, wait 30-60 min
Bacteria + viruses

SODIS/SUN
Clear bottle, 6hrs direct sun
Most bacteria/viruses

BLEACH DOSING REFERENCE (5-8% sodium hypochlorite)

VOLUME	CLEAR WATER	CLOUDY WATER
1 litre	2 drops	4 drops
4 litres	8 drops	16 drops
20 litres	40 drops	80 drops
100 litres	1 tsp	2 tsp
200 litres	2 tsp	4 tsp

SIGNS WATER IS UNSAFE

- Unusual color (brown, green, black)
- Strange smell (sulfur, petroleum, sewage)
- Oily sheen on the surface
- Located near farms or industrial sites
- Anyone who drank it became sick

DAILY WATER MINIMUM

Drinking	**2 litres**
Cooking	**1 litre**
Basic sanitation	**0.5 litres**
Wound care	**0.5 litres**
TOTAL MINIMUM	**4 litres**

SAND FILTER LAYERS (bottom to top)

GRAVEL	FINE GRAVEL	SAND	CHARCOAL	COARSE SAND
4cm	4cm	15cm	5cm	5cm
Drainage layer	Transition	Main filter	Chemical removal	Pre-filter

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"Clean water is not a luxury. It is the foundation of everything else."